

**§ 1065.745 Coolants.**

(a) You may use commercially available antifreeze mixtures or other coolants that will be used in your engine in use.

(b) For laboratory testing of liquid-cooled engines, you may use water with or without rust inhibitors.

(c) For coolants allowed in paragraphs (a) and (b) of this section, you may use rust inhibitors and additives required for lubricity, up to the levels that the additive manufacturer recommends.

**§ 1065.750 Analytical gases.**

Analytical gases must meet the accuracy and purity specifications of this section, unless you can show that other specifications would not affect your ability to show that your engines com-

ply with all applicable emission standards.

(a) Subparts C, D, F, and J of this part refer to the following gas specifications:

(1) Use purified gases to zero measurement instruments and to blend with calibration gases. Use gases with contamination no higher than the highest of the following values in the gas cylinder or at the outlet of a zero-gas generator:

(i) 2% contamination, measured relative to the flow-weighted mean concentration expected at the standard. For example, if you would expect a flow-weighted CO concentration of 100.0 mmol/mol, then you would be allowed to use a zero gas with CO contamination less than or equal to 2.000 mmol/mol.

(ii) Contamination as specified in the following table:

TABLE 1 OF § 1065.750—GENERAL SPECIFICATIONS FOR PURIFIED GASES

Constituent	Purified air <sup>1</sup>	Purified N <sub>2</sub> <sup>1</sup>
THC (C <sub>1</sub> equivalent) .....	<0.05 µmol/mol .....	< 0.05 µmol/mol
CO .....	<1 µmol/mol .....	< 1 µmol/mol
CO <sub>2</sub> .....	< 10 µmol/mol .....	< 10 µmol/mol
O <sub>2</sub> .....	0.205 to 0.215 mol/mol .....	< 2 µmol/mol
NO <sub>x</sub> .....	< 0.02 µmol/mol .....	< 0.02 µmol/mol

<sup>1</sup> We do not require these levels of purity to be NIST-traceable.

(2) Use the following gases with a FID analyzer:

(i) *FID fuel*. Use FID fuel with an H<sub>2</sub> concentration of (0.400 ±0.004) mol/mol, balance He. Make sure the mixture contains no more than 0.05 µmol/mol THC.

(ii) *FID burner air*. Use FID burner air that meets the specifications of purified air in paragraph (a)(1) of this section. For field testing, you may use ambient air.

(iii) *FID zero gas*. Zero flame-ionization detectors with purified gas that meets the specifications in paragraph (a)(1) of this section, except that the purified gas O<sub>2</sub> concentration may be any value. Note that FID zero balance gases may be any combination of purified air and purified nitrogen. We recommend FID analyzer zero gases that contain approximately the flow-weighted mean concentration of O<sub>2</sub> expected during testing.

(iv) *FID propane span gas*. Span and calibrate THC FID with span concentrations of propane, C<sub>3</sub>H<sub>8</sub>. Calibrate on a carbon number basis of one (C<sub>1</sub>). For example, if you use a C<sub>3</sub>H<sub>8</sub> span gas of concentration 200 µmol/mol, span a FID to respond with a value of 600 µmol/mol. Note that FID span balance gases may be any combination of purified air and purified nitrogen. We recommend FID analyzer span gases that contain approximately the flow-weighted mean concentration of O<sub>2</sub> expected during testing.

(v) *FID methane span gas*. If you always span and calibrate a CH<sub>4</sub> FID with a nonmethane cutter, then span and calibrate the FID with span concentrations of methane, CH<sub>4</sub>. Calibrate on a carbon number basis of one (C<sub>1</sub>). For example, if you use a CH<sub>4</sub> span gas of concentration 200 µmol/mol, span a FID to respond with a value of 200 µmol/mol. Note that FID span balance gases may be any combination of purified air

and purified nitrogen. We recommend FID analyzer span gases that contain approximately the flow-weighted mean concentration of O<sub>2</sub> expected during testing.

(3) Use the following gas mixtures, with gases traceable within  $\pm 1.0\%$  of the NIST true value or other gas standards we approve:

- (i) CH<sub>4</sub>, balance purified synthetic air and/or N<sub>2</sub> (as applicable).
- (ii) C<sub>2</sub>H<sub>6</sub>, balance purified synthetic air and/or N<sub>2</sub> (as applicable).
- (iii) C<sub>3</sub>H<sub>8</sub>, balance purified synthetic air and/or N<sub>2</sub> (as applicable).
- (iv) CO, balance purified N<sub>2</sub>.
- (v) CO<sub>2</sub>, balance purified N<sub>2</sub>.
- (vi) NO, balance purified N<sub>2</sub>.
- (vii) NO<sub>2</sub>, balance purified N<sub>2</sub>.
- (viii) O<sub>2</sub>, balance purified N<sub>2</sub>.
- (ix) C<sub>3</sub>H<sub>8</sub>, CO, CO<sub>2</sub>, NO, balance purified N<sub>2</sub>.
- (x) C<sub>3</sub>H<sub>8</sub>, CH<sub>4</sub>, CO, CO<sub>2</sub>, NO, balance purified N<sub>2</sub>.

(4) You may use gases for species other than those listed in paragraph (a)(3) of this section (such as methanol in air, which you may use to determine response factors), as long as they are traceable to within  $\pm 1.0\%$  of the NIST true value or other similar standards we approve, and meet the stability requirements of paragraph (b) of this section.

(5) You may generate your own calibration gases using a precision blending device, such as a gas divider, to dilute gases with purified N<sub>2</sub> or purified synthetic air. If your gas dividers meet the specifications in § 1065.248, and the gases being blended meet the requirements of paragraphs (a)(1) and (3) of this section, the resulting blends are considered to meet the requirements of this paragraph (a).

(b) Record the concentration of any calibration gas standard and its expiration date specified by the gas supplier.

(1) Do not use any calibration gas standard after its expiration date, except as allowed by paragraph (b)(2) of this section.

(2) Calibration gases may be relabeled and used after their expiration date as follows:

(i) Alcohol/carbonyl calibration gases used to determine response factors ac-

cording to subpart I of this part may be relabeled as specified in subpart I of this part.

(ii) Other gases may be relabeled and used after the expiration date only if we approve it in advance.

(c) Transfer gases from their source to analyzers using components that are dedicated to controlling and transferring only those gases. For example, do not use a regulator, valve, or transfer line for zero gas if those components were previously used to transfer a different gas mixture. We recommend that you label regulators, valves, and transfer lines to prevent contamination. Note that even small traces of a gas mixture in the dead volume of a regulator, valve, or transfer line can diffuse upstream into a high-pressure volume of gas, which would contaminate the entire high-pressure gas source, such as a compressed-gas cylinder.

(d) To maintain stability and purity of gas standards, use good engineering judgment and follow the gas standard supplier's recommendations for storing and handling zero, span, and calibration gases. For example, it may be necessary to store bottles of condensable gases in a heated environment.

EFFECTIVE DATE NOTE: At 73 FR 37343, June 30, 2008, § 1065.750 was amended by revising paragraph (a), effective July 7, 2008. For the convenience of the user, the revised text is set forth as follows:

#### § 1065.750 Analytical Gases.

\* \* \* \* \*

(a) Subparts C, D, F, and J of this part refer to the following gas specifications:

(1) Use purified gases to zero measurement instruments and to blend with calibration gases. Use gases with contamination no higher than the highest of the following values in the gas cylinder or at the outlet of a zero-gas generator:

(i) 2% contamination, measured relative to the flow-weighted mean concentration expected at the standard. For example, if you would expect a flow-weighted CO concentration of 100.0  $\mu\text{mol/mol}$ , then you would be allowed to use a zero gas with CO contamination less than or equal to 2.000  $\mu\text{mol/mol}$ .

(ii) Contamination as specified in the following table: